

CHAPTER 2. IOWA MRT MINIMUM DESIGN STANDARDS

The Iowa portion of the Mississippi River Trail will be placed on two types of bicycle facilities, each with unique benefits, costs, and designs. The first such facility is off-road bicycle trails; these are travel paths separate from all motorized vehicles and are expensive to build in large quantities. The other bicycle facility utilized by the Iowa MRT is on-road facilities—bicycle lanes on roadway shoulders. Although bicycle lanes do place bicycles on the same overall travel facility as automobiles and trucks, bicycle lanes provide a safer alternative than sharing the road with motorized vehicles, and the additional paved shoulder used in their construction provides added safety benefits to both motorists and cyclists. The topic of bicycle lanes and motorist safety is discussed in more detail in Chapter 6.

This chapter is an overview of bicycle facility standards and costs for the Iowa Mississippi River Trail. *Iowa Trails 2000*, the state trails resource document developed by the Iowa Department of Transportation (Iowa DOT 2000), was used for standards and cost information. This chapter provides general cost information for the Iowa MRT; a more detailed analysis of Iowa MRT costs by corridor and type of improvements needed is provided in Tables 4.7 and 4.8 in Chapter 4. This costing information does not include the cost of land or right-of-way needed to accomplish the improvement projects for the MRT. The cost of land or right-of-way must be considered in addition to these estimated costs of improvements, for these costs will alter project costs drastically if needed.

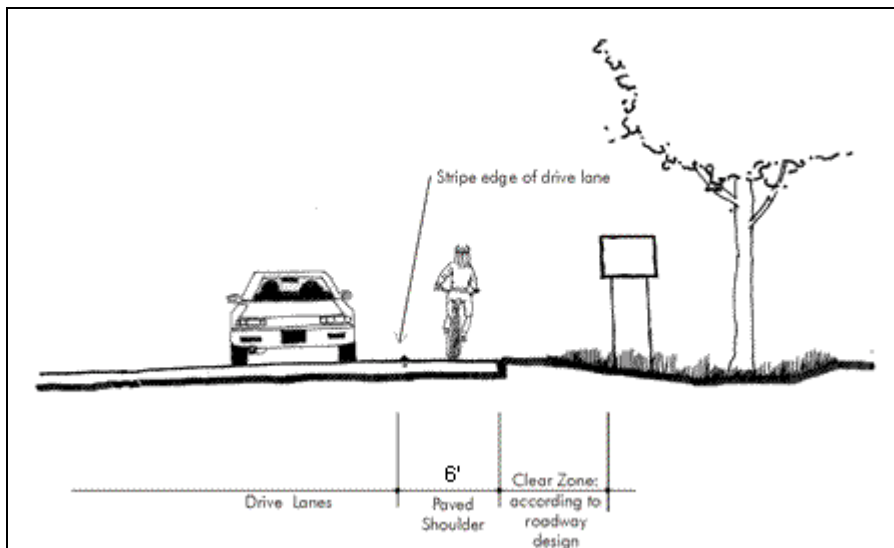
On-Road Standards, Cross Section, and Costs per Mile

On-road bicycle lanes will be the basis for rural segments of the Iowa MRT. Most rural segments of the MRT will be placed on bicycle lanes, except for road segments that were found to be unsuitable for bicycle lanes through the bicycle level of service study, discussed in detail in Chapter 3 and Appendix A. The BLOS measure is based upon average annual daily traffic (AADT) counts, percentages of heavy trucks, roadway width, shoulder characteristics, and other roadway and user data.

Bicycle lanes are generally less costly than off-road bicycle trails. One reason for this is bicycle lanes generally use right-of-way for roadway shoulder expansions, which may already be owned by the agency that has jurisdiction for the roadway. In terms of overall construction, bicycle lanes are an addition to the roadway and do not require the extensive preparatory engineering that bicycle trails do. If a bridge does not have shoulders and the cost to widen the bridge and/or culvert is prohibitive, a bicycle lane could still be constructed up to the bridge; when that route is programmed for improvements, the bridge widening and/or culvert extension could be completed at that time.

The Iowa DOT details the characteristics and requirements for off-road bicycle lanes in the *Iowa Trails 2000* report. The document also recommends on-road bicycle facilities such as shared roads, paved shoulders, and bicycle lanes, but the Iowa MRT has opted to

use both bicycle lanes and off-road trails in rural areas for the added safety of cyclists. Both *Iowa Trails 2000* and the American Association of State Highway and Transportation Officials (AASHTO) *Guide for the Development of Bicycle Facilities* recommend that bicycle lanes be at least 4 feet in width but should be wider if the lane is to be placed on a facility with speeds over 50 miles per hour (AASHTO 1999). Because a large portion of the Iowa MRT is located on high-speed rural highways, the Iowa MRT should have bicycle lanes that are a minimum of 6 feet in width. In areas with higher traffic volumes, a paved shoulder wider than 6 feet may be desirable. In addition, Iowa MRT lanes will be paved with asphalt, a less expensive material than concrete. Asphalt pavement provides a smoother ride than a granular surface. Figure 2.1 is a typical cross-section of a 6-foot-wide MRT bicycle lane.



Source: Iowa DOT, *Iowa Trails 2000*.

Figure 2.1. Typical MRT Bicycle Lane Cross Section

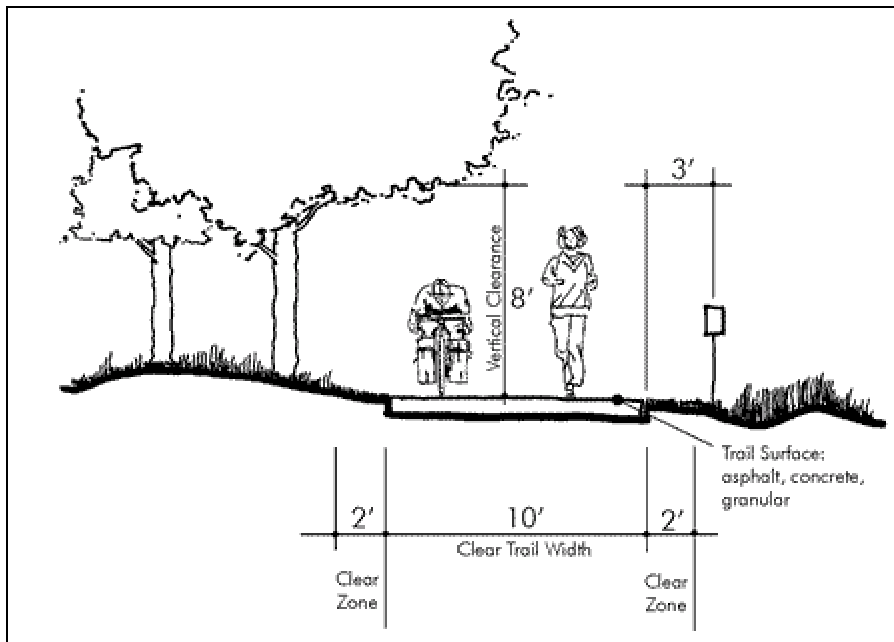
The Iowa MRT will use 6-foot-wide paved shoulders on which to build bicycle lanes. According to the Iowa DOT, these paved shoulders cost approximately \$107,000 per mile, plus other costs and contingency costs (Iowa DOT 2000). Other costs, such as signage, are 10 percent of the estimated cost of construction. Contingency costs, such as regional differences in construction costs, are calculated at 15 percent of the estimated cost of construction. Select road sections slated for bicycle lanes currently have paved shoulders; these corridors will need very little work to be signed and striped for the MRT. The rural segments of the Iowa MRT contain approximately 205 miles of roadway that need paved shoulders constructed, out of the approximately 255 total new miles of the Iowa MRT. The estimated cost for paving shoulders on these roads is roughly \$22 million. However, in addition to the shoulder paving projects, there are just over two miles of roadway structures that may need to be re-decked in order to accommodate bicycle lanes. Structural accommodations cost roughly \$50 per square foot; for slightly over two miles of structural accommodations of 6 feet in width, the estimated cost is \$3.3 million.

Off-Road Standards, Cross Section, Costs per Mile

Off-road bicycle trails will be used as an alternative for bicycle lanes in rural areas when lanes are found to be unsuitable. The construction of new bicycle lanes is encouraged in urban areas to complement existing and programmed bicycle facilities as well as to connect the rural segments of the Iowa MRT. However, as the trail progresses and more trail development opportunities arise, some segments of rural bicycle lanes could potentially be replaced with off-road bicycle trails.

Bicycle trails incur more costs than bicycle lanes, notably in land acquisition, design, and construction costs. Generally, land for the trail must be purchased if the agency constructing the trail does not already own the land. In addition to land acquisition costs, bicycle trail construction costs are considerably higher when compared to bicycle lane costs. Bicycle trails require background engineering to make the trail site suitable, which adds extra time and cost to the project.

The Iowa DOT outlined the basic accepted characteristics of off-road trails used by both bicyclists and pedestrians in *Iowa Trails 2000*. Trails to be used by both cyclists and pedestrians present a challenge when designing for the safety of both parties (Iowa DOT 2000). To provide enough space for slow-moving pedestrians and faster-moving cyclists, *Iowa Trails 2000* recommends a trail width of 10 feet. Figure 2.2 details the dimensions of such a trail.



Source: Iowa DOT, *Iowa Trails 2000*.

Figure 2.2. Typical AASHTO-Recommended Bicycle and Pedestrian Shared Use Path Cross Section

The Iowa MRT Advisory Committee recommends the construction and use of 10-foot-wide asphalt trails for the non-motorized vehicle sections of the MRT. The Iowa DOT estimates the cost of this type of facility at \$85,344 per mile, plus other costs and contingency costs (Iowa DOT 2000). The rural segments of the Iowa MRT recommended for trails not yet existing, programmed, or planned are approximately 8.65 miles in length and will therefore cost approximately \$920,000. (Descriptions of each trail corridor, as well as trail length, project status, and estimated costs are given in Chapter 4.) However, each city along the recommended Iowa MRT route is expected to create bicycle facilities or provide adequate share-the-road facilities in urban areas to connect rural segments of the MRT. The urban trails will incur more costs, but each municipality will assume cost responsibility for their own bicycle facilities. The costs of bicycle trail construction also do not include the cost of land on which to build the trail, an important added expense.